

NURSING CARE IN THE MINIMAL HANDLING OF EXTREMELY PREMATURE INFANTS: A SCOPING REVIEW

Assistência de enfermagem no manuseio mínimo de prematuros extremos: uma revisão de escopo

Asistencia de enfermería en el manejo mínimo de prematuros extremos: una revisión de alcance

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ABSTRACT

This study aims to map the evidence regarding the development and implementation of knowledge on minimal handling protocols for extremely premature newborns (EPNBs) by higher education institutions. A scoping review was conducted based on the Joanna Briggs Institute (JBI) protocol, using data from 2021 to 2025, including full-text open and closed articles. From 947 articles, 9 were selected for final analysis. The results identified the applicability of specific care protocols for EPNBs. It was concluded that there is a need for further studies to expand knowledge on this topic, in order to provide care for premature neonates based on best practices, with different interpretations.

Keywords: Nursing care. Premature infant. Neonatal Intensive Care Unit.

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RESUMO

Este estudo tem como objetivo mapear as evidências acerca do desenvolvimento e implementação do conhecimento sobre protocolo de manuseio mínimo em recém-nascidos prematuros extremos (RNPE) pelas instituições de ensino superior. Realizada uma revisão de escopo baseado no protocolo Joanna Briggs Institute (JBI), utilizando dados de 2021 a 2025, incluindo artigos abertos e fechados completos na íntegra. De 947 artigos, foram selecionados 9 artigos para a análise final. Como resultados, foi possível identificar a aplicabilidade de protocolos específicos de cuidado a RNPE. Concluiu-se que há a necessidade de repetição dos estudos para ampliação do conhecimento nesta temática, a fim de proporcionar um cuidado ao neonato prematuro baseado em boas práticas, com diferentes interpretações.

Palavras-chave: Assistência de enfermagem. Recém-nascidos prematuros. Unidade de Terapia Intensiva Neonatal.

RESUMEN

Este estudio tem como objetivo mapear como evidencia acerca del desarrollo y la implementación del conocimiento sobre protocolo de manuseo mínimo em recém-nacidos prematuros extremos (RNPE) pelas instituições de ensino superior. Realizada una revisión de escopo basada en el protocolo Joanna Briggs Institute (JBI), utilizando datos de 2021 a 2025, incluyendo artículos abiertos y fechados completos na íntegra. De 947 artículos, se seleccionaron 9 artículos para un análisis final. Como resultados, es posible identificar la aplicabilidad de protocolos específicos de cuidado a RNPE. Concluiu-se que há a necessidade de repetição dos estudos para ampliação do conhecimento nesta temática, afim de proporcionar um cuidado al neonato prematuro basado en boas práticas, com diferentes interpretações.

Palabras clave: Asistencia de enfermeira. Recién nacidos prematuros. Unidad de Terapia Intensiva Neonatal.

INTRODUCTION

Nursing care plays an essential role in providing quality patient care, requiring a set of best practices, adequate structure, standardization of processes, and continuous evaluation of results. These elements allow for the identification of opportunities for improvement and the maintenance of satisfactory care standards. According to Donabedian (1980), care should be analyzed through a set of three pillars: structure, process, and results¹.

The structure comprises the available human, physical, material, and financial resources; the process involves the activities carried out by healthcare professionals and users, such as diagnosis, treatment, and the professional-patient relationship; and the results refer to the effectiveness of care, patient satisfaction, and exceeding their expectations. This triad favors the monitoring and qualification of care provided, allowing interventions aimed at continuous improvement².

In this context, the role of the nursing team stands out, whose responsibility goes beyond care practice, also including clear, objective and welcoming communication with users in situations of physical, social or emotional vulnerability³.

When we focus our attention on a specific population—newborns—we find a group that is especially sensitive and vulnerable to hospital-acquired infections. Their physiological immaturity demands a keen clinical eye from the team and the careful definition of a care plan that promotes their clinical development. Among these, preterm infants with a gestational age of less than 30 weeks require even more specialized care, generally in neonatal intensive care units (NICU), due to their extreme fragility, low birth weight, and difficulty adapting to the extrauterine environment⁴.

Analyzing the epidemiological data, in 2020 alone there were 13.4 million births. Premature births worldwide account for 10% of births in a year⁵. In Brazil, approximately 340,000 babies were born prematurely in a year, equivalent to 931 per day⁶.

When we look at the causes of these premature births, we can list: socioeconomic, environmental, and genetic factors, as well as access to comprehensive prenatal care. This highlights prematurity as a public health problem, since its occurrence can be prevented⁶.

Newborns admitted to the NICU are frequently subjected to painful and stressful procedures, such as laboratory tests, insertion of venous access, catheters, and neonatal screening exams, causing suffering to the neonate and the family. Therefore, the role of the multidisciplinary team, especially nursing, is crucial to provide humanized care, effective communication, and safety in the practices performed⁷.

To minimize complications in preterm infants in Brazil, the minimum handling protocol is used from birth up to 72 hours of life, a procedure recommended by the Oswaldo Cruz Foundation, providing a practice to be developed and followed consistently by professionals working in NICU⁸.

In this protocol, its main objective is neuroprotection, establishing procedures that can be applied in the first 72 hours, as this is the critical period for the newborn, where it undergoes extrauterine adaptation and has a higher risk of clinical instability⁸.

The procedures consist of: handling newborns at 3–4-hour intervals to ensure longer deep sleep and energy accumulation; having at least two professionals to perform procedures; changing diapers gently; avoiding closing the diaper for at least 4 days in newborns younger than 27 weeks, among others⁸.

Other essential care measures include: setting a target oxygen saturation according to the newborn's condition; maintaining adequate body temperature; bathing only after the 14th day; avoiding lumbar puncture for at least 72 hours; collecting only the necessary amount of blood for tests, as excessive blood withdrawal may require transfusions; aspirating the endotracheal tube and/or airways only if necessary; changing the baby's position every 6-8 hours during the first 72 hours; providing eye protection and promoting dim lighting, and reducing noise in the care unit⁸.

Nursing is the primary team that provides care in the NICU. Nurses are fundamental professionals in performing various specialized procedures, in addition to providing significant support to families. However, during their training, a low level of clinical focus by educational institutions can be observed, leading to difficulties in their adaptation to the neonatology specialty⁹.

However, this study aims to map the evidence regarding the development and implementation of knowledge about minimal handling protocols for extremely premature newborns (EPNBs) by higher education institutions. The following guiding question was used: how does higher education develop and implement knowledge about minimal handling of extremely premature newborns in the clinical practice of nurses?

METHOD

The methodology of this study is characterized as theoretical and secondary research, with an exploratory approach, conducted through a scoping review, based on the *Joanna Briggs Institute* (JBI) procedure. This type of review aims to map and synthesize available evidence on a given topic, allowing the identification of gaps in scientific knowledge¹⁰.

This methodology was chosen because it is a frequently used and recognized method for searching literature on a specific topic, in addition to assisting in mapping and analyzing studies and, most importantly, identifying existing research gaps. This review protocol was registered on the *Open Science Framework* (OSF) platform under the *Digital Object Identifier* (DOI): ZQ75R.

The methodological steps followed certain recommendations for scoping reviews, incorporating method improvement steps proposed in other studies. The reporting of this review followed the recommendations of the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews* (PRISMA-ScR)¹¹.

To define the research question, the mnemonic PCC was used: Patient (P), Concept (C), and Context (C), since when discussing evidence-based practice, these three components are fundamental elements of the research question and the construction of the question for the bibliographic search. However, for this definition, the following elements were considered: Population: Extremely premature infants, i.e., premature newborns with very low birth weight (below 1000g) or gestational age less than 28 weeks who require neonatal intensive care. Concept: Development and implementation of knowledge by higher education and Context: Minimal handling, which consists of standardizing and reducing the manipulation of the newborn to minimize complications and promote the stability of the preterm infant, which may be the absence of a minimal handling protocol, or conventional care without standardization of handling, or other neonatal intensive care strategies that do not prioritize minimal handling¹².

Regarding the scope of the research, the following inclusion criteria were used: full-text, open-access, and closed-access literature in Portuguese, English, and Spanish, with a time frame from 2021 to 2025, justified by the low number of published studies related to the topic.

The databases used were: *Scientific Electronic Library Online* (SciELO), *Pubmed Medline*, *Scopus*, and *Latin American and Caribbean Literature in Health Sciences* (Lilacs).

The exclusion criteria were: publications with abstracts and/or full texts not available and that were not related to the research topic. Subsequently, titles and abstracts were read for screening purposes, followed by a full reading.

For search refinement, terms available and indexed in the Health Sciences Descriptors list were used, namely "Nursing Care"; "Premature Newborns"; "Premature Birth"; "Neonatal Intensive Care Unit" and their respective terms in pre-established languages. These terms were chosen due to their proximity to the chosen theme, since the term "extremely premature" is not in the indexed list; the term with the greatest similarity was selected to ensure successful searches.

When combining the descriptors, the Boolean operators "OR" and "AND" were used, which were indexed in different configurations to ensure a search with the largest possible number of articles related to the topic.

Table 1 - Strategy for cross-referencing descriptors according to databases and number of studies found.

Crossover strategy	Bases	Number of studies found
"Nursing care" AND "premature newborns" OR "premature birth" AND "neonatal intensive care unit".	SciELO	2
	PubMed	819
	Scopus	28
	Lilacs	-
"Nursing care" AND "premature newborns"	SciELO	-
	PubMed	-
	Scopus	40
	Lilacs	3
"Nursing care" AND "premature newborn" AND "neonatal intensive care unit".	SciELO	-
	PubMed	-
	Scopus	-
	Lilacs	5
"Nursing care" AND "neonatal intensive care unit"	SciELO	25
	PubMed	-
	Scopus	-
	Lilacs	25
TOTAL		947 articles

Source: The authors, 2025.

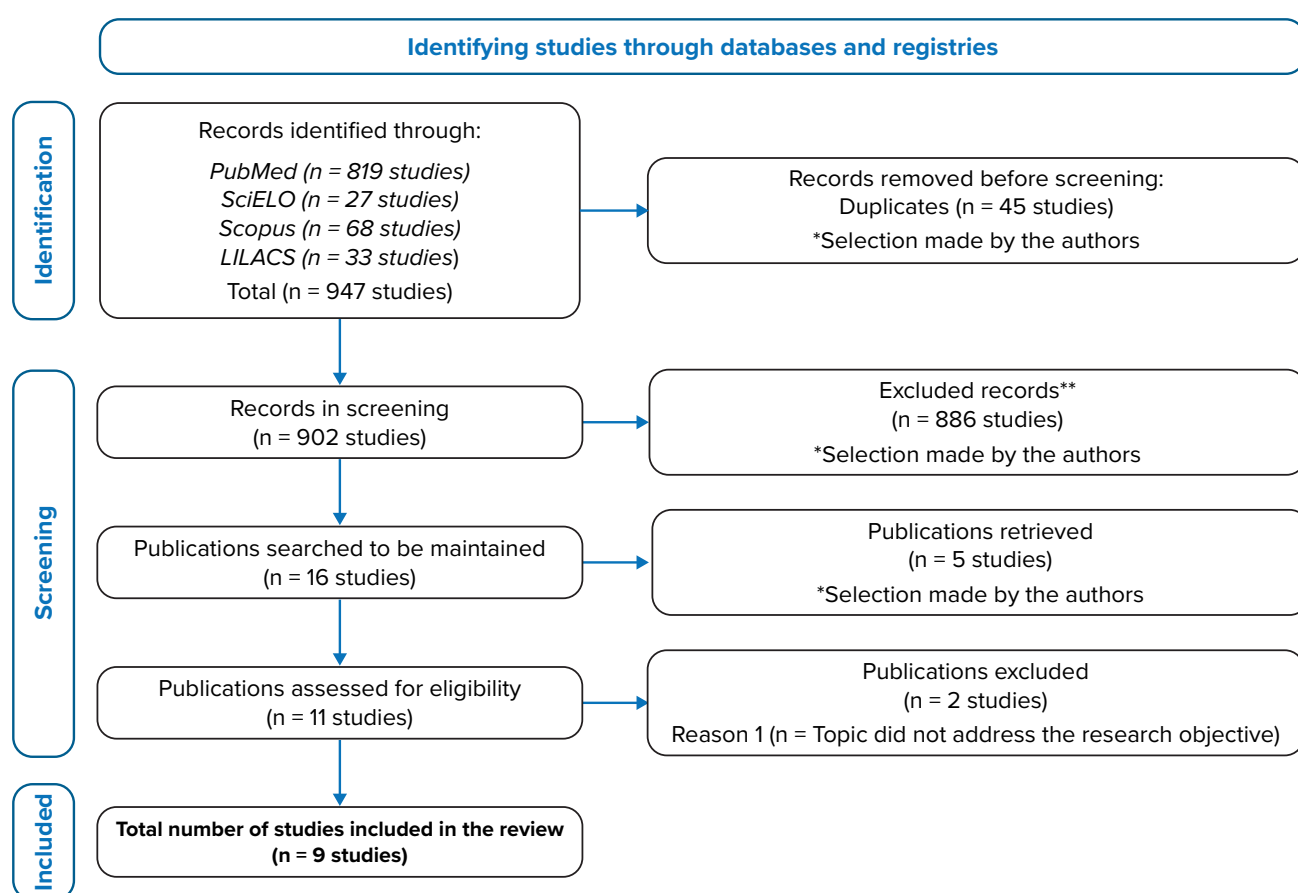
Regarding the analysis of the articles, the tools used were the *Mendeley Reference Manager software* for managing bibliographic references. Subsequently, the articles selected from the respective databases were exported and attached to the *Rayyan software*, a computational tool with artificial intelligence specifically for screening articles in review studies. This was used only as a tool to facilitate visualization and organization, without any interference in the study selection process, which was carried out manually¹³.

During the screening of the 947 articles, both authors used the *Rayyan* platform with the *blinding tool* activated, ensuring that inclusion and exclusion decisions were made independently and blindly between reviewers to reduce selection bias. Any disagreements would be resolved through consensus among reviewers after discussion; however, there was no need for a tie-breaker, since the authors reached total agreement regarding the eligibility criteria¹⁴.

Subsequently, the titles and abstracts of the selected articles were read, and then the inclusion and exclusion criteria were applied to delimit the study, followed by a full-text reading. Next, data from the studies relevant to the research were extracted into a spreadsheet, using the following criteria: article identification, titles, place of publication, country and year, method, and objectives.

Based on the aforementioned descriptors, 947 articles were located, of which 45 were excluded by the authors due to duplication, resulting in 902 articles. After this result, the titles and abstracts were read, and 886 were excluded for not meeting the research objective, resulting in 16 articles. Of these, 5 were excluded for not having a complete article in its entirety, resulting in 11 articles, and 2 articles were removed after full reading because they did not align with the objectives of this research, resulting in 9 final articles for this review (flowchart 1).

Flowchart 1 - Refinement and selection of studies based on PRISMA



Source: The authors. Adapted from the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (PRISMA) 2020 model.

RESULTS

Table 1 - List of selected studies

Identification of articles	Method	Objectives
A1 ¹⁵	Qualitative based on Grounded Theory	To identify the meanings that these professionals attributed to the themes of "care management" and "best practices" within the Neonatal Intensive Care Unit.
A2 ¹⁶	Qualitative Descriptive	To evaluate nursing care in the NICU from the perspective of nurses.
A3 ¹⁸	Scope Review	To identify the evidence regarding developmental care for premature newborns in the NICU.
A4 ¹⁹	Quantitative Observational Cross-sectional	To correlate the physiological and behavioral parameters of pain and stress in premature newborns undergoing minimally invasive care with the type of procedure performed in the NICU during the first 96 hours of life.
A5 ²⁰	Delphi	To identify the components, content of those components, and care intervention models for the growth and development of premature infants that are suitable for implementation in Indonesia.
A6 ²²	Correlational Analysis	To examine the relationship between social support and parental satisfaction with the treatment of premature infants admitted to the NICU.
A7 ²³	Peer Review with Pre-test and Post-test	To evaluate the effects of instructional guidelines and group discussions on the competence of new nurses in the care of premature newborns in the NICU.
A8 ²⁴	Almost experimental with pre-test and post-test.	To examine the effect of a virtual education program based on developmental care on the perception and knowledge of nurses working in a NICU at a hospital in Iran.
A9 ²⁵	Retrospective	To examine the impact of exposure to the NICU on neonatal resuscitation practices, verifying whether this management model can effectively optimize care practices from birth to the NICU.

Source: The authors, 2025.

DISCUSSION

The studies reviewed present methodological diversity, such as descriptive, analytical, observational, Delphi, quasi-observational, peer-review, and scoping review studies. However, there was no duplication of studies to ensure the fidelity and uniqueness of the research. This allowed for a broad mapping and exploration of the subject in different contexts, bringing it closer to the objectives of this research.

In the context of the fundamentals and perception of nursing care in NICUs in Brazil, we have A1, which highlights the need for good practice management in nursing care for newborns, since patient-centered care is crucial for clinical evolution and reduction of infant mortality in the first year of life. Therefore, all care provided must be meticulous to ensure patient safety, a topic that is addressed globally in the health field and must be in constant development and adherence¹⁵.

In this scenario, to ensure the effective application of best practices and the development of quality care, we have the presence of the nurse, a professional who, in addition to performing their care activities, plays a crucial role in health education for their team, establishing bonds, standardization, and teamwork. Thus, A2 shows us the nurse's perspective, the challenges they face in working in this service, highlighting, from one of the interviews, the responsibilities this professional has when working in a NICU, not only technical procedures, but also a team of technicians, a number of beds, and equipment. This account says a lot about the routine challenges faced when working in such a delicate and meticulous unit¹⁶.

There are also difficulties regarding missing, inadequate, or low-quality resources, hindering the guarantee of a successful technical procedure, since extremely low birth weight patients are still developing, since the material is often not the appropriate size for that patient¹⁶.

Furthermore, as in all specialties, there is also the occurrence of hospital infections, which are impactful for the recovery and survival of premature newborns, because in addition to seeking early extrauterine adaptation to the natural environment, there is a struggle against this significant complication for clinical evolution¹⁷.

The NICU can be described as a welcoming, humane environment, and one that often leads to positive outcomes, particularly when considering the development of preterm infants, as every small act of care provided will yield beneficial results in their development. With this in mind, we can discuss specific and particular NICU procedures, such as kangaroo care, which involves placing the preterm infant in skin-to-skin contact on the mother's chest, in a vertical position, with both comfortably positioned skin-to-skin contact, promoting the clinical stability of the newborn and the development of the mother-baby dyad¹⁷.

Kangaroo positioning, or the kangaroo method, is a topic addressed by A3, which highlights the effectiveness of the method in premature infants, with a reduction in the disorganization of motor development, extension movements, and an increase in signs of attention and stress, in addition to its recommendations to perform painful procedures on premature newborns while they are maintained in the kangaroo position, reducing their suffering and ensuring the effectiveness of the procedures¹⁸.

When discussing the handling of premature infants, we must consider how the preterm newborn reacts to these stimuli. The newborn reacts to handling and may even show signs of displeasure; therefore, attention should be paid to their coloration, their cry, and their skin to identify possible changes. Thus, if necessary, handling should be reduced to a minimum or what we call grouped care should be used, a practice in which care should be systematized and grouped to avoid the neonate who has just received one type of care receiving another immediately afterward⁸.

When we mention A4, we have a very relevant piece of data when addressing the topic of handling. This study aimed to verify the physiological response of 26 premature newborns admitted to a NICU. It revealed alterations during the practice of some procedure and/or movement. The physiological responses presented by the newborns during handling were: 96.1% of newborns showed altered oxygen saturation; there was an alteration in pulse rate in 92.3% of newborns. Regarding behavioral responses, eyebrow arching occurred in 88.5% of newborns; followed by 80.8% with altered facial expression; only 7.7% presented a state of satisfaction and comfort¹⁹.

To provide integrated and evidence-based care, scientific foundations are needed that can deliver effective results in the care of preterm infants; therefore, A5 addresses the relevance of teaching based on evidence-based methods²⁰.

Unlike the minimal handling protocol used in Brazil, abroad there are two care models that support quality care: *Developmental Supportive Care* (DSC) and the *Newborn Individualized Developmental Care and Assessment Program* (NIDCM). This study addresses the combined use of these two methods, where DSC focuses on care aimed at protecting and preventing stress in the newborn generated by the environment, such as noise, positioning, group care, and skin-to-skin contact, while NIDCM describes individualized care based on the specific changes of each newborn and, especially, the involvement of the family in care. Both protocols are mentioned in the study as essential for teaching healthcare professionals, especially the method used, the Delphi method, which includes the presence of specialists in the subject matter²¹.

The A6 section presents parental satisfaction regarding the care provided to their children hospitalized in the NICU. The study revealed high levels of stress in mothers, not only in relation to the neonate's health status, but also regarding noise and excessive light, as well as a lack of communication among the staff. The support received by mothers from nursing staff was primarily informational, leaving them emotionally vulnerable

and failing to address their specific needs. Therefore, given the importance of the social context, as obtained in this study, even with the lack of expected emotional support, mothers showed greater emotional and social satisfaction than fathers. Fathers expressed dissatisfaction with the healthcare team, without specifying the exact situations involved²².

In terms of nurse training, it is necessary to understand from the outset how the training process of these professionals occurs, starting from their institutional curricular guidelines. Study A7 presents a comparative study of training with traditional institutional guidelines, similar to what we currently have in several institutions, with training through group discussions on the specific topic of care for premature newborns. The results did not show any significant differences in the training process; however, it showed greater participation among those who had training with group discussions, in addition to a positive evaluation of attitudes, being double that compared to teaching based on institutional guidelines²³.

Regarding the education of professionals, A8 addresses the topic of specific training conducted for those working in NICUs. Research was carried out with two groups: a control group and an intervention group using e-learning, combining two specific areas of knowledge: neonatal intensive care and the use of new teaching technologies. The results showed great effectiveness in teaching, even in the online modality. Another topic addressed was the use of a quality teaching tool with sufficient resources for its intended purpose, including video lessons, texts, audio, and simultaneous support for any questions. Regarding access to this platform, materials were available 24 hours a day, allowing professionals to access them as many times as they wished and for as long as necessary, which facilitated staying updated and ensured flexibility in relation to their routine. Thus, there were positive effects through this teaching modality and the proposed intervention²⁴.

Addressing the topic of health education, the study conducted in A9 shows the effectiveness of implementing educational programs for neonatal nurses. A randomized clinical trial was carried out, with two groups: an intervention group and a control group. The intervention group received specialized training in neonatal intensive care, focusing on development, management, positioning, skin-to-skin contact, stress reduction, and family support. Analyzing both groups during preterm infant admissions to the unit, it was noticeable that the intervention group obtained an effective response in care, with developed theoretical knowledge, confidence, attitude, good practices in positioning, noise control, and encouragement of kangaroo care, demonstrating that education directly impacts successful outcomes in the care of preterm infants²⁵.

CONCLUSIONS

The minimal handling protocol is a benchmark in neonatal intensive care in Brazil; however, it was not mentioned in studies conducted in other countries. Nevertheless, the DSC and NIDCM protocols were mentioned as similar and well-structured protocols in several international institutions.

Based on the evidence found, it is important to highlight the assessment of reality in neonatal care, so that, with the data obtained, improvements in newborn care can be formulated.

However, this study highlights the need for health education for nursing professionals, not only during their training but also for those already working in this specialty. Therefore, a basic understanding of existing care protocols is required.

However, it is important to highlight the gaps in this study, where the absence of articles conducted in Brazil made it difficult to search for research covering the minimal handling protocol. The lack of specific descriptors for the topic addressed, such as "extremely premature" and "minimal handling," can also be mentioned, resulting in a high number of studies obtained in the first stage of screening, and also, in the search using the descriptors and their respective combinations, addressing themes different from the proposed topic.

However, it was concluded that, based on the results obtained, higher education institutions did not address the implementation and development of knowledge about the minimum handling protocol for preterm

infants during training, but rather, after training, through distance learning and educational programs for neonatal nurses focused on their practice.

However, further studies are needed to expand knowledge on this topic, in order to provide nurses with the confidence to work in neonatology, aiming at providing care to premature newborns based on best practices with the goal of ensuring quality in nursing care.

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